**Density Lab**

**Density =**

**Goal:**

1. To determine the density of tap water
2. To determine the density of given objects
3. To correctly predict if an object will sink or float
4. To apply this concept to solve a real life problem

**Part 1: Density of Water**

1. Design and conduct a procedure to find the **MASS** of a given amount of water (50 mL and 25mL). RECORD your data in the table below.
2. Calculate the **density** of the water- SHOW your work.

*Data Table:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Volume of Water (mL)** | **Mass of Graduated Cylinder (g)** | **Mass of H2O and Graduated Cylinder (g)** | **Mass of H20 (Subtract out mass of graduated cylinder)** | **Density of water (g/mL)** |
| 25 mL |  |  |  |  |
| 50 mL |  |  |  |  |

1. What is the density of water in grams per milliliter?
2. Does the density of water depend on how much water you have? WHY or WHY NOT?

**Part 2: Density of Objects**

1. Find the **MASS** of each object on the table. Record in the table below.
2. Find the **VOLUME** of each object on the table. Record in the table below.
3. Determine the **DENSITY** of the three objects on the table. Record the density in the table below.
4. Include **UNITS** and SHOW work.

|  |  |  |  |
| --- | --- | --- | --- |
| **Object** | **Mass** | **Volume** | **Density** |
| **Object A** |  |  |  |
| **Object B** |  |  |  |
| **Object C** |  |  |  |

**HINT:**

There are two main ways to find the VOLUME of a solid object:

1. Use geometry formulas (see attached cheat sheet)
2. Use the “water displacement” method:
3. Fill a beaker with water, and record how much water you start with
4. Put the object in the water
5. Record how much water was displaced (how much the level changed)🡪 this is the volume of the object!

**Part 3: Predictions**

1. You are given 3 liquids with the following masses and volumes.
   1. Calculate the density of each liquid
   2. Complete the density column using all 3 liquids and LABLE your drawing

|  |  |  |
| --- | --- | --- |
| Liquid | Mass (g) | Volume (mL) |
| 1 | 23 | 25 |
| 2 | 70 | 60 |
| 3 | 54 | 35 |

You are now given the following objects. Draw a picture of where they would “stay” if they were dropped in the density column above.

|  |  |  |  |
| --- | --- | --- | --- |
| **Object** | **A** | **B** | **C** |
| **Density** | **0.2 g/mL** | **1.5 g/mL** | **5.0 g/mL** |

**Part 4: Applications**

1. Describe **three** real life situations when it is important to know about the density of solids, liquids, and gasses:

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**Formulas for Volumes of Common Shapes:**

cube = a3 http://math2.org/math/geometry/cube.gif

rectangular prism = a × b × c http://math2.org/math/geometry/rprism.gif

irregular prism = **b ×** h http://math2.org/math/geometry/prism.gif (b = area of base)

cylinder = π× r2 × h http://math2.org/math/geometry/cylinder.gif

pyramid = (1/3) **b** h http://math2.org/math/geometry/pyrimid.gif(b = area of base = length \* width)

cone = 1/3 π × r2 × h http://math2.org/math/geometry/cone.gif

sphere = (4/3) π × r3 http://math2.org/math/geometry/circle.gif